

Chapter 6

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Accident Investigation

Accident investigation assignments may be initiated by the Accident Reports Section staff, Headquarters Senior Staff, or a Regional Administrator.

Accidents, which may be assigned for investigation by FRA's Office of Safety, are:

1. Passenger or freight train collision or derailment resulting in fatal or serious injuries to one or more passenger(s) or employee(s);
2. Highway-rail grade crossing collision resulting in death to one or more persons in a commercial vehicle or school bus; or death to three or more persons in a vehicle;
3. Train accident/incident involving hazardous materials, which necessitate an evacuation, or imperil or threaten a community due to fire, explosion, or release of toxic substances;
4. A non-casualty train accident resulting in derailment of a locomotive and/or large number of cars, extensive property damage, damages exceeding \$1 million, etc;
5. Any Amtrak accident/incident;
6. Nuclear train accident/incident;
7. An accident/incident involving run-away equipment with or without locomotives;
8. Collisions involving maintenance-of-way or hi-rail equipment;
9. Any accident/incident whose investigation would substantially serve to promote railroad safety;
10. Any accident resulting in death to an on-duty railroad employee, including natural causes, regardless of craft;
11. Any accident meeting LAX regulations [Ref. 229.17]; and
12. Other train accident/incidents likely to generate considerable public interest.

Types of Investigations and Controls

Accident investigation numbers will be assigned by the Accident Reports Section staff. The final accident investigation report should be submitted to the Accident Reports Section within 90 days from the day it is assigned. Investigations of railroad accidents will be classified as follows:

"A" accident investigations are full-scale investigations, which will be published after approval by the Associate Administrator for Safety. A narrative report and a Factual Railroad Accident Report (Form FRA F6180.39) will be prepared. A preliminary (five-day) report will be required.

"B" train accident investigation will be submitted on Form FRA F6180.39, Factual Railroad Accident Report. Appropriate documentation supporting factual statements that is pertinent to the accident must be attached to the report. The final report should not be submitted to headquarters unless all of the required documentation is included. These accident reports are included in the Summary of Accidents Investigated By The Federal Railroad Administration database compilation. A preliminary (five-day) report will be required for these accidents.

"C" (MEMO) train accident/incident investigation reports, a number-controlled memorandum report detailing the "who, what, when, where, and how" of an accident/incident. A probable cause statement should be a separate paragraph in the memorandum. A contributing factor statement, if made, should be a separate paragraph at the end of the memorandum. The report should be filed within 90 days of assignment. A preliminary (five-day) report may be required.

"FE" accident investigation - A narrative investigation report detailing the death of an on-duty railroad employee, including natural causes, regardless of craft. A preliminary (five-day) report is required for all FE reports, except those that result from natural causes.

"CFE" accident investigation - A narrative investigation report detailing the death of a railroad contractor. A preliminary (five-day) report is necessary.

"LAX" investigation - An investigation of an accident due to failure from any cause of a locomotive, or steam generator, or any part or appurtenance thereof, or a person coming in contact with electrically energized part of appurtenance hereof, resulting in serious injury or death of one or more person(s). [Reg. 229.17]

Accident Investigation - Event Recorders: Following an accident that is reportable to the NTSB, the railroad will take no action (unless data is threatened with destruction) to extract or analyze the recorded data until the NTSB has had 8 hours from time of notification to the National Response Center to declare that it will conduct an investigation. After 8 hours (or less if NTSB says they will not conduct an investigation) the railroad is required to preserve the data for an FRA-reportable accident. The railroad may read and duplicate it. If the NTSB says they will conduct an investigation (notification within 8 hours), the railroad will be governed by NTSB's instructions.

Discovery of Serious Problems or Deficiencies Not Covered By Federal Regulations

It is the responsibility of the Operating Practices Division in FRA's Office of Safety Assurance and Compliance to review and analyze railroad operating and safety rules. If, during accident investigations, an inspector discovers serious problems or deficiencies not otherwise covered by the Federal safety standards or regulations, a full report with recommendations and supporting documentation should be forwarded to the Staff Director, Operating Practices, Office of Safety Assurance and Compliance, Washington, D.C.

Preparation of Train Accident/Incident Recap Sheet

Enclosed is a copy of an FRA "Train Accident/Incident Recap Sheet" which must be completed by the accident investigator-in-charge and submitted as a cover sheet with all accident investigation reports. Instructions for completing the recap sheet are as follows:

1. Identifying number assigned by Washington headquarters. Example: C-01-97, B-01-97
2. Refer to Form FRA F6180.39, Section 2, i.e., "Derailment, Head End Collision, Highway- Rail Grade Crossing," etc.
3. Railroad's initials. (Per FRA Guide for Preparing Accident/Incident Reports)
4. Date of occurrence: Month/Day/Year.
5. Time incident occurred: Use standard a.m.- p.m. designations and appropriate time zone, i.e., 7:30 a.m. CDT, 11:15 p.m. EST, etc.
6. List nearest city as recorded in geographic location codes.

7. Approved two letter state code and GSA numeric code.
8. Total fatalities resulting from the accident.
9. Total injuries resulting from the accident.
10. Totals only, i.e., 2 locomotives, 26 cars, 3 pieces of on-track equipment.
11. Total FRA-reportable monetary damages. (Do not include lading loss or cleanup costs)
12. As identified by the responsible railroad(s): Main, Yard, Siding, etc.
13. Reference 213.9.
14. Method(s) of operation in the accident area at the time of the accident.
15. As identified by the railroad(s): Include speed and direction of movement(s). State type of move, i.e., freight, passenger, work train, cut-of-cars, lite locomotive, etc.
16. Tox testing info-Circle appropriate answers.
17. Hazmat info-Circle appropriate answers and enters number of people evacuated.
18. Use same wording as stated in the accident report accompanying this form.
19. If necessary, same wording as used in the accompanying accident report.

Federal Railroad Administration Train Accident/Incident Recap Sheet

- (1) ACC/INC. Number: _____ (2) Type of Accident: _____
- (3) RR(S) Code: (a) _____ (b) _____ (c) _____
- (4) Date: _____ - _____ - _____ (5) Time: _____ AM / PM
- (6) City: _____ (7) State: _____
- (8) Killed: _____ (9) Injured: _____
- (10) Equipment
Derailed: _____ (11) RR Damages: \$ _____
- (12) Track Type: _____ (13) Track Class: _____
- (14) Method(s) of Operation: _____
- (15) Movements Involved: include type (i.e., passenger, freight, cut of cars, lite loco., etc.) symbol, or number, speed and direction.
(a) _____
(b) _____
(c) _____

- (16) Toxicological Tests:
 Samples Collected: Yes - No
- Authority: FRA - Railroad - Police
- Results: Positive - Negative

- (17) Hazardous Material
- Release: Yes - No
- Evacuation: Yes - No # Evacuated: _____

- (18) Probable Cause: _____

- (19) Contributing Factors: _____

The "Railroad Accident Notification," Form FRA F6180.41, is used to organize the initial accident information for transmission to the Accident Section.

Instructions for Completion of the "Railroad Accident Notification," Form FRA F6180.41:

Railroad Accident Notification

U.S. Department
 of Transportation
 Federal Railroad
 Administration

1. Submitted By:
2. Date
3. Time
4. Name of Railroad
5. Location of Accident Time and Date
6. Method of Operation

Item 1 - Your name.

Item 2 - The date you are making the report.

Item 3 - The time you are making the report.

Item 4 - The corporate name of the railroad on whose property the accident occurred.

Item 5 - The name of the nearest city, town, community, state;

Item 6 - The Method Of Operation - the authority for the movement of trains in the accident area

7. Train Information
 Train #1 Train #2 Train #3

- A. Kind of Train
- B. Train Number
- C. Direction
- D. Number of Locomotive(s)
- E. Number of Cars
- F. Estimated Speed
- G. Equipment Derailed

8. Casualties

- | | | |
|---------------------|--------------------------------|-------------------------------|
| A. Number
Killed | B. Number Seriously
Injured | C. Number Slightly
Injured |
|---------------------|--------------------------------|-------------------------------|

9. Probable Cause of Accident

Item 7 - Train #1 - The train in compliance with carrier operating rules; will be identified as 12A on Form 6180.39. Train #2 - The train not in compliance with carrier operating rules; will be identified as 12B on Form 6180.39.

- A. Freight, Passenger, Work Train, etc.
- B. The number shown in the timetable or the number addressed in the train orders.
- C. Timetable direction (in the case of head-on collisions, give direction of each train).
- D. Show only the number of the locomotive units involved for each train/movement. If locomotive numbers are available they may be included.
- E. Number of cars (loads/empties, tonnage, length) and caboose, if any.
- F. Estimated speed of each train.
- G. Show locomotive units and cars (i.e., 2 locomotive units, 5 cars).

Item 8 - A, B, C - Indicate numbers of, not class of, employees. (Note; if the injury is considered FRA reportable, classify it as serious for this report).

Item 9 - The cause that the carrier representative may have indicated during initial inquiry or that you determined from your first observation.

10. Hazardous Material Cars Derailed or Significantly Damaged

- | Car Type | Init. And No. | Cargo | Fire, Explosion, Etc. |
|----------|---------------|-------|-----------------------|
| A. | | Yes | No |
| B. | | Yes | No |

	C.	Yes	No
11.	Number Cars Derailed or Damaged		
12.	Populated Area	Yes	No
13.	Evacuation?	Yes	No
14.	No. People Evacuated		
15.	Rail-Highway Crossing		
16.	Crossing Protection	Accident?	
	Yes	No	
17.	Type of Motor Vehicle		
18.	Cargo		
19.	Interstate		
	Yes	No	

Item 10 - Use additional sheets when required for Items A, B, C. For Item 10A., when tank cars are involved, if possible, determine DOT designation, initial-number and cargo. The inspector should assure the correct spelling of the names of the material involved. Fire, Explosion or Leaking involved in Fire -Where "YES" is checked, show the condition.

Item 11 - Number of hazardous cars derailed or damaged to the extent of Leaking, Rolled Over or Punctured, etc.

Item 12 - Are there people who will be affected by the hazardous materials in the area?

Item 13 - Were the people ordered evacuated? If there are no hazardous materials involved in the accident, this section will be marked N/A.

Item 14 - No of people evacuated.

Item 15 - Accidents involving motor vehicles at highway/rail grade crossings.

Item 16 - The kind of warning devices; cross bucks, flashing lights, gates.

Item 17 - Passenger car, van, farm tractor, semi-truck, pick-up truck.

Item 18 - Name of commodity in vehicle involved.

Item 19 - Vehicle registration indicates inter-state operation.

20. Brief Description of Accident

Form FRA F6180.41 (4-84)

Item 20 - Brief is the key word. One or two statements describing what happened are adequate. An explanation of " WHY" is not needed in this block. Any additional information which does not fit in any of the blocks above, including FRA or State personnel en route to the accident and their estimated time of arrival.

U.S. Department
of Transportation
Federal Railroad
Administration

Railroad Accident Notification

1. Submitted By: David Green

2. Date: June 23, 1997

3. Time: 9 a.m.

4. Name of Railroad

5. Location of
Accident

Time and
Date

Union Pacific Railroad Company

Devine, TX MP 290.4

10:50 p.m. 6-22-97

6. Method of Operation

Track Warrant Control (Non-ABS), Austin Subdivision

7. Train Information

Train #1

Train #2

Train #3

A. Kind of Train:

Freight

Freight

B. Train Number

Z-YCMS-21

LDLI-22

C. Direction:

South

North

D. Number of
Locomotive(s)

2 (UP 9186)

3 (UP 5981)

E. Number of Cars

69 loads, 3945 tons

75 loads/11empties (7417)

F. Estimated Speed

Unknown

20

G. Equipment Derailed

3 cars, 2 locos
destroyed

8 cars, 2 locos
destroyed

8. Casualties

A. Number
Killed
3

B. Number Seriously
Injured
1

C. Number Slightly
Injured

9. Probable Cause of Accident

Unknown

Foreman in Charge: Unknown

10. Hazardous Material Cars Derailed or Significantly Damaged

	Car Type	Init. And No.	Cargo	Fire, Explosion, Etc.	
	A.	N/A	Yes	No	
	B.		Yes	No	
	C.		Yes	No	
11.	Number Cars Derailed or Damaged				
12.	Populated Area	Yes X	No		
13.	Evacuation?	Yes X	No		
14.	No. People Evacuated: NONE				
15.	Rail-Highway Crossing Accident?		16.	Crossing Protection	
	Yes X	No		N/A	
17.	Type of Motor Vehicle	18.	Cargo	19.	Interstate
	N/A	N/A		Yes	No
20.	Brief Description of Accident				

Two UP trains collided head-on. Z-YCMS-21 (southbound) was issued authority from Gessner, TX to Melon, TX after the arrival of the MLDLI (northbound). The MLDLI had authority from Melon, TX to Gessner, TX. Southbound locomotive sheared cab off northbound train.

Casualties: Z-YCMS-21, Engineer N. A. Wilhelm (killed), Conductor R. W. Dennis (critical injured)

MLDLI, Engineer B. W. Bolmer (slight injury), Conductor T. Yarborough (killed).

A third, unidentified body has been found in the wreckage.

The 3 damaged cars on the Z-YCMS-21 are articulated intermodal cars. The UP 5084 on the MLDLI survived the crash and an event recorder should be available. All other locomotives were destroyed.

Damages: Locomotives ?????

Cars \$501,000

Track \$40,000

Form FRA F 6180.41 (4-84)

Format for Preliminary (Five Day) Accident Report

The preliminary (five day) accident report should follow the format of the "C" Accident. This report is intended to be brief but should contain all information known about the accident. By following the format of the "C" accident the inspector has an excellent working document from which the final accident report can be prepared.

No documentation is needed to support the five-day report.

The five-day report is due five calendar days from the date the accident is assigned to the inspector.

At the time the five-day report is completed, the post-accident investigation and probable cause may not be known.

The following is an example of a five-day report:

Memorandum

U.S. Department
of Transportation
Federal Railroad
Administration

Date: July 2, 1997

Subject: Five-Day Report, Train Accident, B-02-97
Union Pacific Railroad, Devine, Texas, June 22, 1997

From: David H. Green, Railroad Safety Specialist (OP)

To: John F. Megary, Regional Administrator, RRS-35

Synopsis

On June 22, 1997, at 10:52 p.m. CDT, Union Pacific Railroad Company (UP) southbound freight train symbol Z-YCMS-21 (UP 9186) collided head-on with UP northbound freight train MLDLI-22 (UP 5981) at milepost MP 290.4 near the intersection of the UP main track and the highway-railroad underpass for Texas State Highway 132 in Devine, Texas. Devine is located about 30 miles south of San Antonio, on the San Antonio Division, Austin Subdivision.

Location and Method of Operation

The Austin Subdivision between San Antonio SOSAN Yard limits, Milepost 268, and yard limits Laredo, Milepost 397.5, is a single main track with sidings for meeting and passing trains. The method of operation is non-signaled Direct Train Control (Track Warrant Control -TWC) territory. The maximum authorized speed for trains is 49 mph. The terrain is generally rolling hills with few curves for 20 miles north and south of the point of collision. Immediately before the collision, both the southbound train and the northbound train were moving on ascending grades of less than 1 percent toward a crest at MP 290.2, a point two tenths of a mile north of the point of collision at the highway-railroad underpass. Approaching the point of collision from the north, the southward train traversed a right hand curve approximately 7,000 feet north of the point of impact. The northbound train was on tangent track for approximately 2 miles approaching the point of collision. These terrain features obscured each train crew's advanced view of the opposing train until the two trains were approximately 4,000 feet apart. The trains were moving at a closing speed of approximately 80 miles per hour.

Circumstances Prior to the Accident

Train UP 9186 South:

Train Z-YCMS-21, lead locomotive UP 9186, an intermodal train with two locomotives and 62 loaded intermodal cars en route from Chicago, Illinois, to Laredo, Texas, for interchange to Nacionales De Mexico Railroad, stopped at UP's SOSAN Yard in San Antonio for service, inspection and re-crewing. On June 22, 1997, after completing their statutory off-duty period, the new train and engine crew, consisting of a conductor and locomotive engineer, went on duty at San Antonio at 10:15 p.m. CDT. The train crew

received their initial Track Warrant and Track Bulletins by computer generated printed copies at SOSAN Yard before the train departed San Antonio and proceeded southbound toward Laredo. While at SOSAN Yard, they also received a Track Warrant authorizing train movement from SOSAN Yard Limits MP 268 to Gessner Siding, with authority to hold the main track at Gessner. The crew was issued an additional Track Warrant movement authority by radio at Gessner, which authorized their train's movement from Gessner Siding to Melon Siding, with the condition the Track Warrant was not in effect until after the arrival of Train UP 5981 at Gessner. The train was operating at an estimated speed of 45 to 49 miles per hour, and was in power when the engineer placed his train in emergency braking on seeing the opposing train's headlight.

Train UP 5981 North:

Train MLDLI-22, lead locomotive UP 5981, an intermodal train with three locomotives, 75 loaded cars and 11 empty cars, en route from interchange with the Nacionales De Mexico Railroad at Laredo, Texas to San Antonio, Texas, originated from the UP terminal at Laredo. The train crew stopped at Derby, Texas, to add 8 more loaded ballast cars to their train. At the time of the collision, the train consisted of 83 loaded cars and 11 empty cars. The train and engine crew, consisting of a conductor and locomotive engineer, went on duty at Laredo at 1 p.m. CDT on June 22, 1997, after having received a statutory off-duty period. The train crew received their initial Track Warrant and Track Bulletins at Laredo before departure, and copied additional movement authority Track Warrants while en route northbound. While the train was at Melon siding, the train crew was issued a Track Warrant movement authority by radio which authorized their train's movement from Melon siding to Gessner Siding and instructed them to clear the main track at Gessner siding, with the condition the Track Warrant was not in effect until after the arrival of Train UP 400 at Melon. After Train UP 400 South arrived at Melon, train UP 5981 departed en route to Gessner siding, and received another Track Warrant authorizing their train to operate on the main track from Gessner to Yard Limits SOSAN, with the condition the Track Warrant was not in effect until after the arrival of Train UP 9186 at Gessner. The train continued toward Gessner expecting to take the siding and meet Train UP 9186 there. The train was operating at a recorded speed of 42.9 mph, and was in power run 4, when the engineer placed his train in emergency braking on seeing the opposing train's headlight.

Accident

Train UP 9186 South:

Train UP 9186 is believed to have been in emergency braking from approximately 2,000 feet in advance of the collision. No event recorder data or crew statement was available to indicate the speed at impact.

The engineer of Train UP 9186 was fatally injured when he jumped from the locomotive. The conductor sustained blunt trauma injuries and burn injuries over 35 percent of his upper body, and was in critical condition immediately after the accident. His condition is improving.

Train UP 5981 North:

Train UP 5981 was placed in emergency approximately 1,300 feet in advance of the collision and its speed was reduced to a recorded 19.8 miles per hour at impact. The conductor of train UP 5981 sustained fatal blunt trauma and burn injuries. The engineer of this train sustained serious injuries when he jumped from the locomotive. He was treated and released from a San Antonio hospital.

At the point of collision, the locomotives and front cars of both trains were derailed and overrode each other, with several locomotives and cars falling off the railroad overpass into the roadway underpass below (no highway users were involved in the accident). Fuel tanks ruptured on four of five involved locomotives, and diesel fuel ignited in a fireball. The ensuing fire burned for approximately 4½ hours. There was some diesel spillage into an adjacent creek, but environmental damage was contained and minimal.

The train crews of the two trains identified the opposing train with sufficient time to place their trains in emergency braking, and all crewmembers of both trains attempted to detrain before the collision. The remains of two other unidentified persons were found in the wreckage, and were presumed to be transient trespassers, pending positive identification.

The weather at the time of the collision was clear with a light west wind and the temperature was 80 0F.

Track, Structure, and Equipment Damage:

Damage estimates include four locomotives destroyed, one locomotive heavily damaged, 11 cars destroyed, 1,000 feet of track destroyed, and the steel beam open deck railroad overpass heavily damaged by fire. Property damage costs are estimated at:

Locomotives	Rail Cars	Track & Bridge	Lading	Clearing
\$4,150,000	\$501,300	\$1,150,000	\$302,000	\$115,000

Post-Accident Investigation

The following local, state, and federal agencies responded to the accident:

1. Devine Police Department
2. Medina County Sheriffs Department
3. Devine E.M.S.
4. Lytle E.M.S.
5. Devine Fire Department
6. Hondo Fire Department
7. Natalia Fire Department
8. Lytle Fire Department
9. Moore Fire Department
10. Castroville Fire Department
11. Texas Department of Public Safety
12. Texas Natural Resource Conservation Commission
13. Accident investigators from Brotherhood of Locomotive Engineers
14. Accident investigators from the United Transportation Union
15. Railroad Commission of Texas
16. Federal Railroad Administration
17. National Transportation Safety Board

Signal inspections were limited to gathering data from wayside detectors north and south of the accident location, as this subdivision is non-signaled territory.

Joint track inspections by representatives from the UP, NTSB, FRA and railroad labor did not reveal any track anomalies that would have contributed to the cause or severity of the accident.

Joint mechanical inspections of the remaining rail cars from both trains by representatives from the UP, NTSB, FRA and railroad labor did not reveal any rail car defects that would have contributed to the cause or severity of the accident.

Substantive locomotive inspections were not possible, except for the trailing locomotive on the northbound train, because the locomotives were substantially destroyed by impact and fire. The inspection of locomotives did not reveal any defect that would have contributed to the cause or severity of the accident. Investigators were able to recover the event recorder data from the trailing locomotive of the northbound train only. All other event recorders were destroyed in the impact or ensuing fire.

Immediately after the collision, a team of FRA investigators conducted inspections of the Austin Subdivision train dispatcher's computer assisted train dispatching system records and recorded radio and telephone communications at the UP's Harriman Train Dispatching center in Omaha, Nebraska. Review of these records revealed that when the train dispatcher transmitted by radio Track Warrant Number 8389 to UP Train 9186 at Gessner, he correctly entered the Track Warrant into the computer assisted train dispatching system, but failed to transmit line 7 which restricted UP Train 9186 at Gessner until after the arrival of UP Train 5981 to the crew. This error was compounded when the crewmember on UP Train 9186 who copied the Track Warrant read it back exactly as transmitted (omitting line 7), and the train dispatcher failed to detect the error during read back. The train dispatcher transmitted an "OK" time and initials to the train crew which indicated the Track Warrant was copied correctly by the crew and could be acted on. These two errors created an overlap of authority for the northbound and southbound trains between Gessner and Melon.

Probable Cause

The immediate probable cause of the train collision was determined to be the train dispatcher's error in transmitting the Track Warrant, and the subsequent failure to detect the error during the train crew's "read back" of the Track Warrant.

FRA's investigation revealed the computer assisted dispatching system in use by UP contributed to the probable cause of the accident in that the system does not employ hard-coded safety edit procedures for the train dispatcher to utilize to ensure that the train crew's read back is accurate (i.e., a method to mechanically or electronically underscore each word or number repeated by the employee receiving a Track Warrant transmitted by the train dispatcher).

Remedial Action:

In response to the findings in this accident investigation, on June 30, 1997, FRA issued Safety Directive 97-1 to the railroad industry, to establish positive communication standards to ensure mandatory directives issued by radio under Direct Train Control systems (such as the Track Warrant Control system in use on UP) are properly copied, repeated, and understood by both the train dispatcher and the train crew who is to implement the mandatory directive. This is to be accomplished by requiring the train dispatcher to count the number of boxes checked in the Track Warrant and transmit this information to the crew, along with a statement or instruction that the Track Warrant includes a requirement to meet another train. The train crew must also include this information in its read back of the Track Warrant to the train dispatcher, before the Track Warrant is completed by the train dispatcher by transmitting the "OK" time for the Track Warrant.

Revised Format for Memorandum or "C" Accident Investigation Reports

G-92-14 Original Issue Date: 06-01-91 (G-91-07)

Revised Issue Date: 07-01-97

This technical bulletin prescribes the revised memorandum or "C" accident investigation report format. This report is intended to be brief. Clearly, not all of the items contained in each of the major sections of the report outline will be relevant in each accident investigation. The items that do not relate to either the probable cause or any contributing factor(s) need only be developed as necessary for the reader to clearly understand the events that transpired. The report should focus on the circumstances relative to the condition or failure which resulted in the derailment, collision, or other type of train accident, and what was done to correct it.

Only provide the necessary documentation to support the probable cause and any contributing factor(s) as well as the documentation outlined on the Attachment Page.

1. **Synopsis:** Briefly summarize the accident so the reader can understand the event covered by the investigation. Some of the information will be expanded upon in the heading entitled "The Accident." The synopsis will generally be two paragraphs and contain the following information that essentially describes "what happened."

First Paragraph:

Date and time.

Railroad(s), and type of train(s) involved.

Timetable direction of movement.

Type of accident (derailment, collision, etc.).

Railroad location to the nearest tenth of a mile.

City (or nearest city) and State.

Second Paragraph:

Total number of casualties by type (crew, passengers, etc.).

Equipment derailed.

Initial statement of hazardous materials involvement.

Initial statement of evacuation details (including negative statement).

Weather including precipitation, visibility and temperature.

2. **Location and Method of Operation:** Include only information needed to describe the approach to, and the accident area in order to set the stage for the accident. Based solely on this section of the report, the reader should be able to draw a sketch of the accident area showing all of the pertinent details.

Describe the accident area. Include grade, curvature, location of other involved tracks, turnouts and sight distance (including restrictions).

Indicate the Method of Operation on the railroad track segment involved. Give the maximum authorized speed for the track segment. If a speed restriction existed at the location where the accident happened, give the restricted speed and the railroad document that imposes this restriction (timetable instruction, bulletin, train order, etc.).

For a highway-rail grade crossing accident, use a minor heading to give information about the highway. Include type highway (public, private, etc.), width, number of lanes, speed for highway user, DOT crossing number, angle of the highway-rail crossing, and crossing warning devices. Also include highway grade, curves and/or tangents at the crossing approach involved. List sight restrictions for highway users.

3 Circumstances Prior to the Accident: If more than one train is involved, describe the circumstances separately for each train, using the train identifiers as a minor heading. This means there would be one or more separate paragraphs for each movement. Carry the events up to just before the accident/incident occurred. The following should be included.

Give the job titles of the crew. For example: The crewmembers of Train 123 West consisted of an engineer, a conductor, and two brakemen.

Give the date, time, and location the crew reported for duty. Tell whether or not covered service employees had completed their statutory off-duty period prior to reporting for duty.

Describe the consist (make-up) of the train. Include the number of locomotives, loads, empties, and tonnage. Tell the reader what the final destination was or would have been.

Detail any inspections, tests or other events that are related to the accident. For example, if the train air brake system is involved, explain where the brakes were tested, by whom and the results of the test(s). If cars were added to or removed from the train en route, say so, indicating whether or not the air brakes were tested again.

Describe the actions of the crewmembers up to the point of the accident, i.e. - where they were seated or standing and what they were doing. If more than one crewmember with a specific title is involved, describe them separately. For example: "Brakeman No. 1 was seated on the north side of the controlling locomotive; Brakeman No. 2 was seated on the south side of the second locomotive." If train handling was a factor, include throttle and brake settings on the controlling locomotive. Give the estimated or recorded speed of all movements.

For a highway-rail grade crossing accident, use a minor heading to give information about the highway vehicle movement. Include the number of passengers, speed and direction of movement. If the vehicle is a bus or commercial truck, give the destination, if known.

4. The Accident: In an orderly sequence of events, describe what happened immediately prior to, during and after the accident. If more than one train is involved, describe the circumstances separately for each train, using the train identifiers as a minor heading. This should include the following information that apply to the accident:

The actions of the crewmembers.

The actions of other people involved.

The events that occurred as a result of the accident. For example:

- If a derailment/collision occurred, tell how many cars or locomotives were derailed/ damaged and where they were located in the train.

- If hazardous materials cars were derailed or damaged, give the details. List evacuation information.
- If a highway-rail collision occurred, give the details. Include the location where the train and motor vehicle stopped after impact.

Tell what the emergency response was, and who responded.

Give pertinent details on the extent of casualties. This includes:

- nature and extent of injuries for each person, and
- medical treatment administered; whether they were treated and released or hospitalized.

List FRA reportable damage amount in \$\$. (Do not include lading or cleanup costs in this figure.)

5. Post Accident Investigation: In a logical sequence, describe the results of the investigation. Weed out details that are not relevant, but remember that some information is relevant even though the findings were negative. This includes both FRA findings and findings of others involved in the investigation. For example, if local police responded to a highway-rail collision, include any relevant information. Use minor headings to narrate the findings of the various investigative parties. The following information should be included:

Toxicological test results are always relevant. This also applies to tests done on highway vehicle occupants. FRA tests and inspections of track, equipment, signals, operations and rule compliance are relevant to the probable cause. They would also be included if the cause is in dispute and the information is pertinent to resolution. For example, if the railroad cites an equipment cause and FRA cites a track cause, you should provide the details of both the track and the equipment inspections.

If a highway-rail grade crossing accident, the locomotive and crossing warning devices must be tested. Include the results even if the devices functioned as intended. Follow-up on any reported malfunction of active warning devices.

Note: Whenever an accident investigation results in the discovery of a non-complying condition, which is causal or contributed to the accident, a violation should be submitted. A statement is to be included, in the post-accident testing section; such statement to be worded as follows: "As a result of this investigation, a recommendation for prosecution has been submitted."

6. Probable Cause: End the report with a statement of probable cause, including any contributing factor(s). The probable cause statement should be very brief. Make sure that the probable cause, and any contributing factor(s) are supported by the facts contained in the report. Refer to the publication titled Summary of Accidents Investigated By The Federal Railroad Administration for accepted probable cause statements.

7. Attachments: Prepare a list of attachments that are not numbered. The minimum documentation should include the following:

Copy of the title page of the timetable and pages showing the method of operation, sub-division on which the accident occurred, the authorized speed at the point of accident, and applicable special instructions.

A copy of the applicable railroad rules.

A sketch of the accident area.

Properly mounted and labeled photographs.

Applicable railroad reports to FRA, i.e., FRA F6180.54, .55, .55a, or .57.

Interviews of crewmembers and witnesses.

For highway-rail crossing accidents, include a copy of the police report and a report of interview obtained from the engineer. In that interview, determine whether or not the headlight was illuminated, the bell was ringing, and the whistle was sounded. Obtain the engineer's observations of the vehicle approaching the crossing, and the active warning devices at the crossing.

Other relevant supporting documentation i.e., lab reports, efficiency tests with explanation, etc. In most cases, your first draft will not be adequate. This generally holds true even if you are proficient at report writing. Most good writers review their work and find ways to improve it. Don't be reluctant to do more than one draft. After you have worked on a report, your mind becomes fatigued. When this happens, it is very hard to make an objective review of your own work. That's why you should have one of your peers review your final draft. Accept their review as constructive criticism.

The following is an example of a Memorandum or "C" Accident Investigation Report:

Memorandum

U.S. Department
of Transportation
Federal Railroad
Administration

Date:	August 17, 1992	Reply to Attn. of: C-36-92
Subject:	Accident Investigation, No. C-36-92	
From:	Jerry J. Jacob Operating Practices Inspector	
To:	I. M. Going	

Synopsis

On July 1, 1992, at approximately 2:54 a.m. EST, an eastbound CSX Transportation (CSX) freight Train R553-30 derailed at Carlyle, Illinois. The derailment occurred on the CSX Chicago Division, Illinois Subdivision.

There were no injuries. Sixteen freight cars derailed. None of the derailed equipment contained hazardous material and no evacuation was involved. The weather was cloudy with a temperature of about 70° F.

Location and Method of Operation

In the accident area, a single main track extends eastward and westward. The method of operation is by Direct Traffic Control supplemented by an Automatic Block Signal System. The maximum authorized speed is 60 mph for intermodal trains and 50 mph for freight trains.

Approaching the accident site from the west there is a tangent in excess of 5,000 feet to the point of derailment and for a considerable distance beyond. The grade is 0.32 percent descending eastward.

Circumstances Prior to the Accident

The crew of Train R553-30 consisted of an engineer, conductor, and brakeman. They reported for duty on June 30, at Collinsville, Illinois, at 11:15 p.m., after receiving statutory off-duty period. The crew was transported via a crew van to the Alton & Southern Railroad (ALS) connection at Fairmont City, Illinois, where the engineer and conductor boarded the controlling locomotive of Train R553-30. The brakeman remained in the crew van and was transported to Breese, Illinois (milepost BC 298.7) where the crew was scheduled to pick up 29 cars.

Train R553-30 consisted of two locomotives, CSXT 7700 (controlling), 18 loaded and 18 empty freight cars. The mixed freight train weighed 2,265 tons, and was 2,654 feet in length. An initial terminal air brake test was satisfactorily performed by ALS carmen at the ALS Gateway Yard in East St. Louis. The train was equipped with an operating end-of-train device (EOT).

The train departed the ALS connection at 1:18 a.m. on July 1, and operated eastbound on the main track toward Evansville, Indiana. The train traveled without incident to Breese where the crew picked up 29 cars that had been set out earlier by the crew of CSX Train R372-30. No intermediate train air brake test was performed on these cars by the R553-30 train crew. However, after the train was re-coupled on the main track, a rear car brake application and release test was made using the EOT.

Train R553-30 departed Breese at about 2:35 a.m. with 65 cars, and operated eastbound at a speed of about 50 mph without incident. The conductor and brakeman were in the locomotive control compartment with the engineer seated at the locomotive controls.

The Accident

At approximately 2:54 a.m., Train R553-30 experienced an undesired emergency brake application at milepost BC 291.3. After the train stopped, the conductor and brakeman dismounted the locomotive to inspect their train. Shortly after beginning the inspection, they discovered that the trailing truck of idler car SCL 765464 had derailed and was partially pulled out from under the car body. Further inspection disclosed that the 31st through the 46th cars were also derailed and blocked the Illinois Route 127 highway-rail grade crossing. The conductor notified the engineer who in turn radioed the CSX train dispatcher.

Emergency respondents included the Carlyle Fire and Police Departments, Clinton County Emergency Services and Disaster Agency, and the Clinton County Sheriff's Department. A small brush fire, attributed to sparks from the derailment, was extinguished by local firemen. Carlyle city police with the assistance of the Clinton County Sheriff's Department re-routed traffic away from the accident area.

Post Accident Investigation

Post-accident investigation disclosed that the R4 wheel on the lead axle of the 33rd car lifted up onto the south rail. It traveled on the rail approximately 14 feet before dropping on the outside of the rail resulting in the derailment of 16 cars. According to the speed tape from the controlling locomotive, the train was operating at a speed of 46 mph when it derailed.

The 33rd car was a CSX maintenance-of-way crane, SCL 765452, moving on its own wheels. The boom was detached and riding on an idler car immediately ahead. This crane was one of the 29 cars picked up by the R553-30 train crew at Breese and was being hauled with the counterbalance in the trailing position. The conductor stated he knew the crane was in his consist after making the pick-up at Breese. However, he stated that he was not aware of restrictions governing the crane's movement because he did not have a qualifier (movement restriction notice) listed on his train orders or train bulletin. Consequently, he did not comply with CSX Operating Rule 1003.12 when he made the pick-up on line of road.

Further investigation disclosed the crane had been placed in the Breese siding at approximately 8:45 p.m. on June 30 by the crew of Train R372-30. Train R372-30 was blocked by and originated at the Terminal Railroad Association of St. Louis (TRRA), Madison, Illinois, on June 30. The conductor of Train R372-30 stated that he was not aware of the crane within his consist when he departed from the TRRA in Madison.

He said that his train was pre-tested and ready for departure upon the crew's arrival and that neither his train orders nor train bulletin listed a qualifier. He also stated that a qualifier, listed on his train bulletin, would have been the only way he and his crew could have known that the crane was in their consist.

According to a TRRA representative, they do not have written instructions from CSX requiring that cranes and machinery be cleared through the CSX train dispatcher before movement. He also said that there were no written instructions to them from CSX governing either the location of a crane within a train consist or the positioning of the crane's counterbalance.

The TRRA yardmaster is responsible for holding dimensional loads until cleared through CSX. However, the TRRA was unaware that CSX considered a maintenance-of-way crane and idler car as a dimensional load. The CSX crane and idler car were measured for clearance by a CSX carmen on June 26, 1992. Then, on that date, a CSX clerk in Collinsville, Illinois faxed the bill of lading and clearance form measurements to the appropriate offices for issuance of waybill and clearance form. However, no waybill or clearance form was issued.

The TRRA has no written instructions from CSX requiring that cranes and machinery be cleared through the CSX train dispatcher before movement. TRRA has requested but not received written instructions from CSX governing handling restrictions of maintenance-of-way-equipment.

The TRRA computer system is programmed to show a car as empty when pulled from an industry if the car was placed in the industry as a load. TRRA supplied CSX with a train line-up, which included the maintenance-of-way crane and idler car. CSX computer system is programmed to flag maintenance-of-way equipment only when entered into the system as a load.

The estimated damages to railroad equipment was \$263,590, track and signal damage was \$30,300.

Toxicological tests were performed on the crew under the authority of the CSX agreement. Test results were negative.

Applicable Rules and Regulations

CSX Transportation Operating Rules

Revised January 1, 1992

Rule 808. Table 8 - Equipment Speed Restrictions:

Engineering department pivoted or rotating equipment moving on its own wheels, unless specifically cleared for a higher speed - 25 MPH.

Rule 826. Engineering department work equipment on own wheels including . . . pivoted rotating cranes must be handled within 5 cars of an occupied engine or caboose under observation of the crew.

CSX Division Miscellaneous Rules

Rule 1003.12 Movement of Restricted Loads and Equipment:

. . . Line of road train crews and yard crews handling dimensional and restricted loads or equipment over main tracks which are either picked up on line of road or picked up at interchange are required to notify the dispatcher and/ or the control station for authority to move . . .

Probable Cause

Excessive train speed because the crewmembers on CSX R553-30 did not adhere to a 25 mph speed restriction on the maintenance-of-way equipment in their train.

Possible contributing factors: CSX and TRRA did not implement controls to ensure that restrictions on equipment were identified and delivered to operating crews.

Corrective Action

TRRA issued instructions to their carmen on July 15, 1992, governing handling restrictions of CSX equipment. CSX issued instructions on July 18, 1992, instructing train crews to observe their train when departing the TRRA. The CSX computer system has now been programmed to flag assigned maintenance-of-way equipment whether loaded or empty.

Format for Employee Fatality Investigations - FE's

(Header information is standard.)

Report: (FRA assignment number.)

Railroad: Full Name (RR Code)

Location: City, State

Date, Time: Month, Day, Year, Time

Probable Cause: Cause of Accident, not cause of death. (Simple statement. Not a synopsis!)

Employee: Occupation Job Title

Age Whole #

Length of Service # Years

Last Rules Training . . . Date

Last Safety Training . . . Date

Last Physical Exam. . . . Date

Circumstances Prior to the Accident

(section 1) Place employee on duty. Make descriptive statements concerning train/crew consist(s), reporting location(s), actions by crew up to point of accident. Describe any event related to the accident or incident's occurrence (inspections, tests, or other occurrences that will have prominence in the accident). Separate out multiple movements or groups into additional paragraphs.

(section 2) Describe accident area and conditions such as lighting, ground conditions, structures involved, etc.

(section 3) Describe weather conditions (when appropriate).

The Accident

Describe actions immediately prior to, during, and after the accident. In an orderly sequence of events, describe the accident, then summarize events that occur as a result of the accident. For fatalities, end with emergency response, treatment of injuries, and declaration of death. Include time and date if different calendar day.

Post-Accident Investigation

(Section 1) Describe FRA's post-accident investigations results. Describe any FRA inspections of equipment or conditions that might have contributed to the accident, state the results of that inspection (attach inspection report to investigation). A good illustration would be the inspection of safety appliances after an employee fell from a piece of equipment. Use of railroad investigation documentation is permissible, but always conduct an independent FRA investigation.

(Section 2) Detail pertinent outside inspections or investigations performed by the railroad, public entities, or other parties to the investigation.

(Section 3) Describe results of toxicological testing performed as a result of the accident. Describe under whose authority toxicological tests were performed (if not performed under FRA authority).

Applicable Rules

Detail rules applicable to the probable cause or contributing factors of the accident. This section is not restricted to railroad rules. Applicable rules can be Federal or State regulations, State or local laws, or any other prohibition.

Documentation: Attach appropriate documentation including interviews, sketch of scene, and copies of pertinent documentation including applicable rules. Attach a copy of the rules publication cover and of pages containing the applicable rule(s) on 8 ½" x 11" sheets. Attach a floppy disk containing the narrative. Copies of non-FRA investigation reports should be included (OSHA, police, etc.).

Note: In non-train incidents where Department of Labor rules under the Occupational Safety and Health Act (OSHA) regulations prevail, the inspector shall inform the railroad that OSHA should be notified. If the railroad declines to notify OSHA, the inspector will notify the Regional Administrator for guidance.

An example of an Employee Fatality Investigation (FE) follows:

Report: FE-08-94

Railroad: The Atchison, Topeka and Santa Fe Railway Company (ATSF)

Location: Castle Rock, Colorado

Date, Time: February 9, 1994, 11 a.m. (MST)

Probable Cause: The crewmembers of a work train did not: provide a lookout on the caboose while backing up; operate their train at restricted speed; or comply with Federal radio standards and procedures.

Possible contributing factors: The carrier did not implement existing procedures to provide positive protection for the Bridge and Building (B&B) employees, and failed to provide proper supervision to direct and coordinate the ditching operation. The B&B employees contributed to the severity of the accident by not maintaining a sharp vigil as they repaired roadway signs while their hi-rail truck occupied a main track.

Employee: Occupation Mechanic/Welder

Age 60 years

Length Of Service 41 years

Last Rules Training January 26, 1994

Last Safety Training. February 1, 1994

Last Physical Examination June 3, 1992

Circumstances Prior To The Accident

At 7 a.m. on February 9, 1994, four ATSF maintenance employees reported for work at Castle Rock, Colorado (milepost 705.2). Two of the maintenance employees, a machine operator, and a trackman, were assigned to operate a Jordan spreader as part of a work train. A Jordan spreader is an on-track piece of maintenance-of-way equipment that is used to clean and deepen right-of-way ditches. It is not self-propelled, and was included in the work train equipment consist. The other two ATSF maintenance employees, a B&B bridge inspector, and a B&B mechanic/welder, were assigned to repair or replace right-of-way signs that were disturbed or damaged as a result of the work train ditching operation. The B&B employees were assigned a hi-rail pick-up type truck for transportation.

Also at 7 a.m. on the day of the accident, an ATSF work train crew consisting of a conductor, engineer, and brakeman reported for duty at Big Lift, an ATSF station located 12.8 miles north of Castle Rock. The crewmembers had completed their statutory off duty period. The crew obtained Track Warrant No. 00005 which authorized their train, designated as ATSF 6355 South, to work on an 18 mile section of the Southward main track of the two track main line between Orsa (milepost 709.5) on the north and Greenland (milepost 691.5) on the south. Track Warrant authority for the movement of trains on the Southward main track is supplemented by the signal indications of an Automatic Block Signal (ABS) system arranged for movement southward with the current of traffic. The two main tracks in this area are separated by a sizeable distance. The grade in the accident area is 1.33 percent, descending northward.

After obtaining their Track Warrant, the work train crewmembers traveled in the conductor's personal automobile from Big Lift to their train, which was located on the siding at Castle Rock. At Castle Rock the work train crewmembers and the maintenance employees held a job briefing to discuss the day's work activities. At about 8:30 a.m., after making the required train air brake test, the work train crew moved their train from the siding onto the Southward main track, and operated southbound to clean and improve the right-of-way drainage ditches between Milepost 704 and Milepost 701.9. The work train was 270 feet in length. From the south, it consisted of the Jordan spreader, locomotive ATSF 6355, two gondolas and a caboose. The short end (front) of the locomotive faced southward as did the control compartment of the Jordan spreader.

The two B&B employees set their hi-rail truck on the Southward main track behind the work train and proceeded southbound to repair right-of-way signs. This placed the B&B employees within the Track Warrant limits authorized for the work train. The B&B employees repaired the right-of-way signs until about 10 a.m. when they exhausted their supplies. The bridge inspector notified the machine operator that he was removing the hi-rail from the track to go for additional supplies, and to pick up the machine operator's personal vehicle.

At about 10:45 a.m., after transferring additional materials from the B&B mechanic/welder's truck to the hi-rail truck, the bridge inspector and B&B mechanic/welder returned to the work area. The bridge inspector talked on the company radio to the machine operator and advised him that he had returned with the machine operator's personal vehicle. However, he did not apprise the machine operator of his intention to reoccupy the Southward main track with the hi-rail truck.

The two B&B employees then placed the hi-rail truck on the Southward main track at the Territorial Road crossing (milepost 702.9). The front of the truck faced southward. They traveled southbound to Milepost 702, and stopped to work on the milepost sign. They stood behind the truck's tailgate in the gage of the Southward main track, which is tangent for over 1.5 miles in each direction.

Meanwhile, the work train was located near Bridge 701.83, less than one-quarter mile south of the hi-rail truck. The engineer and brakeman were seated in the locomotive control compartment. The engineer was at the locomotive control stand on the west side, and the brakeman was by the window on the opposite side.

The machine operator and trackman were in the control compartment of the Jordan spreader. The conductor was in his private automobile about one-quarter mile south of the work train on an adjacent highway that paralleled the west side of the railroad right-of-way. In the accident area the highway, U.S. 85, shares a common property line with the railroad, and is 52 feet west of the Southward main track.

The weather was clear, cold, and sunny. The temperature was approximately 20 OF.

The Accident

According to the engineer, at about 10:55 a.m., the Jordan spreader operator notified him via radio that another pass was needed to deepen the track ditches. This required the work train crew to back-up their train northbound so as to reposition the Jordan spreader for the additional pass. The work train backed-up northbound at a speed of between 3 and 5 mph, and had traveled only a short distance when the engineer observed a workman lying in the ditch on the west side of the track. The engineer stopped the work train, and the brakeman climbed down from the locomotive to investigate. The brakeman found the injured bridge inspector in the ditch, and the mechanic/welder unconscious underneath the northernmost gondola. The caboose had collided with the hi-rail truck during the back-up movement, and shoved the truck into the B&B employees standing directly behind it. The hi-rail truck derailed in the track parallel to the rails, and sustained \$3,500 in damages. The crew of the work train contacted the train dispatcher on the radio to report the accident and request assistance.

Emergency response personnel responding to the accident included the Castle Rock Fire and Rescue Team, the Douglas County Sheriff's Department, and the Douglas County Coroner. The B&B mechanic/welder suffered massive head injuries, and was declared dead at the accident site by the Douglas County Coroner. The bridge inspector was transported to the Swedish Memorial Hospital, Englewood, Colorado, where he was treated for leg injuries and post-accident trauma.

Post-Accident Investigation

According to ATSF officials, the B&B employees should have obtained a Track Car Line-up as required by Rule 951 Placement or Movement on Tracks and Rule 952 Line-Ups, before they placed their hi-rail truck on the main track. Rule 952 also requires a sharp lookout at all times. According to the bridge inspector, he did not obtain a Track Car Line-up from the dispatcher. Instead, on the day of the accident, as well as for the three previous days, he utilized the authority that had been granted to the work train by Track Warrant to place the hi-rail truck on the main track and work within the same limits. That procedure is not permitted by carrier rules.

When the B&B employees returned with the additional signpost material and the machine operator's personal vehicle no formal notice was given to either the Jordan spreader operator or the work train crewmembers that the B&B employees intended to reoccupy the main track with their hi-rail truck.

According to the bridge inspector, there was no discussion between either B&B employees as to who would maintain a sharp vigil as they worked behind the hi-rail truck to repair the roadway sign. However, their failure to maintain a sharp vigil contributed to the severity of this accident. A railroad access road located adjacent to the east side of the Southward main track provides easy access to the railroad right-of-way at the accident site, and the roadway signs at the accident site could have been repaired without ever placing the hi-rail truck on the main track. However, other signs located south of the accident site would also be in need of repair as a result of the ditching operation, and this necessitated the placement of the hi-rail truck on the track to improve the overall job efficiency.

Carrier operating rules require that a crewmember must take a conspicuous position on the leading car or in advance of a shoving movement to provide protection. Additionally, ATSF Timetable Special Instructions require that when handling cars ahead of an engine on a main track, movement must be made at restricted speed, i.e., permit stopping within one-half the range of vision.

At the time of the accident, the conductor was in his private automobile, located south of the work train, trying to contact the dispatcher on the radio. According to the conductor he could not see the north end of the work train from that location, and because he was utilizing a different radio channel, did not hear the Jordan spreader operator's request that required the back-up movement.

The brakeman remained in the work train locomotive control compartment throughout the back-up movement. Thus, none of the work train's crewmembers were in position to provide the required protection for the northbound back-up movement. Furthermore, the engineer could not see the trackage behind the caboose, and therefore, could not operate the work train at restricted speed. These factors made the collision with the hi-rail truck a virtual certainty.

According to the engineer of the work train, he initiated the northbound back-up movement based solely on the Jordan spreader operator's radio communication request for the work train to make one more pass through the work area. Federal Radio Standards and Procedures (49 CFR Part 220) require that when radio communication is used in lieu of hand signals in connection with a back-up movement, the distance of the movement must be specified. Implicit in that requirement is the understanding that the way is known to be clear for the distance specified.

The provisions of 49 CFR Part 220 also require that any radio communication which is not completed in accordance with its requirements be treated as though not sent, and that radio communications may not be used in connection with a railroad operation in a manner which conflicts with the requirements of Part 220. The engineer's failure to comply with those Federal requirements is a contributing factor in this accident, and as a result of this investigation, a recommendation for prosecution against the ATSF is being submitted.

Prior to receiving the request for emergency assistance, the dispatcher on duty at the time of the accident had not communicated with either the work train crew, the maintenance workers on the Jordan spreader, or the B&B employees operating the hi-rail truck. This dispatcher commenced duty at 8:36 a.m. The Track Warrant for the work train was issued earlier by a dispatcher on the preceding shift.

The ATSF maintenance employees were cleaning ditches with the work train and repairing right-of-way signs without a foreman, supervisor, or designated employee in charge to direct and coordinate work train movements and B&B activities. The lack of organization and coordination was a primary contributing factor to this accident. An ATSF senior official indicated that the carrier does require and conduct operational tests on maintenance of way employees to ensure rules compliance. However, there was no record of any operational tests conducted on the Denver Subdivision.

Results of toxicological testing of the deceased, the dispatcher, and the work train crewmembers were negative.

Analysis

A Track Car Line-up would not have provided the two B&B employees with any protection because Track Warrant No. 00005 was in effect at the time of the accident, and the work train would have been the only train listed on a Track Car Line-up covering the accident area. Both B&B employees could see the work train on the main track south of their hi-rail truck.

However, there are other carrier rules that should have been utilized to provide positive protection for the two B&B employees. For example Rule 412, Protecting Men or Machines, provides for a track warrant to be issued to protect men or machines within the same or overlapping limits with a train when, in part, trains authorized to occupy the same or overlapping limits have been notified of the authority granted men or machines and have been instructed to make all movements at restricted speed and to stop short of men or machines on or fouling track. The employee in charge of maintenance must also be notified by track warrant.

With the application of Rule 455, Protection by Track Bulletin, maintenance of way employees can be granted the exclusive use of a section of track. A track bulletin can require that a train must not enter the limits granted to maintenance employees until verbal authority is received from the maintenance employee in charge. Clearly the application of Rules 412 and in particular 455 would have provided positive protection for the two B&B employees.

The B&B employees did not inform either the Jordan spreader operator or the work train crewmembers that they intended to reoccupy the main track with their hi-rail truck when they returned to the work site with the additional signpost material. Although there was no requirement for the B&B employees to report on or off the track, their failure to inform either a work train crewmember or the Jordan spreader operator effectively negated the casual understanding that existed between those employees regarding the B&B employees' utilization of Track Warrant 00005 to occupy the main track. This illustrates the critical importance of properly utilizing approved procedures that will assure the highest level of worker protection. The carrier's decision not to require and enforce the provisions of the positive protection rules, such as Rule 455, is the primary contributing factor in this accident.

Applicable Rules

General Code of

Operating Rules

Second Edition

Effective -- October 29, 1989

103(J). Shoving or Fouling: When cars or engines are shoved and conditions require, a crew member must take a conspicuous position on the leading car or in advance of the movement to provide protection

...

Definitions

Restricted Speed: A speed that will permit stopping within one half the range of vision. . .

ATSF System Timetable No. 3

In Effect at 12:01 a.m.

Sunday, October 25, 1992
All Subdivisions

Special Instructions

Rule 103(E) amended to read: When handling cars ahead of engine on main track or controlled siding, movement must be made at restricted speed.

Rules and Instructions

For

Maintenance of Way

And Structures

Effective October 29, 1989

Operation of Track Cars

Rule 951. Placement or Movement on Tracks: Track cars may be placed upon the track and operated with the following types of protection:

(1) Track Car Line-up.....Rule 952

Rule 952. Line Ups: Line-up of all trains will be issued by the train dispatcher and will be copied on the prescribed form and repeated unless mechanically transmitted. Before occupying track, the track car operator will read the line-up to all other occupants of the track car and retain line-up in his possession until the end of the work period.

Track car operators must not depend entirely on line-ups but must at all times keep a sharp lookout and take other measures as will ensure safety . . .

Code of Federal Regulations

Part 220 - Radio Standards and Procedures

Subpart B - Radio Procedures

220.43 Communication consistent with rules.

Radio communication may not be used in connection with a railroad operation in a manner, which conflicts with the requirements of this part 220, . . .

220.45 Communication must be complete.

Any radio communication, which is not understood or completed in accordance with the requirements of part 220 and the operating rules of the railroad, shall not be acted upon and treated as though not sent.

220.49 Switching, backing, or pushing.

When radio communication is used in lieu of hand signals in connection with switching, backing or pushing of a train, engine or car, the employee directing the movement shall give complete instructions or keep in continuous radio contact with the employees receiving the instructions. When backing or pushing a train, engine, or cars, the distance of the movement must be specified, and the movement must stop in one-half the remaining distance unless additional instructions are received . . .

The following is the suggested format for a railroad accident investigation Report of Interview:

Suggested Format for Railroad Accident/Incident Interview Report

Report of Interview

C 01-97 (Assignment Number)

Person Interviewed: Name

Job Title

Movement

(Don't include addresses or phone numbers)

Date of Interview - Month-Day-Year

Place of Interview: City, State

Interview Conducted by: Name of Inspector, Discipline

City, State (Inspector's Office)

Multiple Inspectors Should be Listed

Others Present:

(Body of Interview)

Items Covered Should Include:

Age - Service – Experience

Hours of Service - Rest Prior

Weather – Visibility

Events Prior - During - After Accident

Any Unusual Occurrence – Problems

Location of Employee at Time of Accident

*Interview will be written in a narrative style, which is easily readable and follows a logical sequence of events.

An example of an accident investigation Report of Interview follows:

Report of Interview

C-10-97

Person Interviewed: Bryan W. Voker - WS Locomotive Engineer

MLDLI-22

Date of Interview: June 28, 1997

Place of Interview: Rob Bittermann's Residence - San Antonio, Texas

Interview Conducted by: G. P. Perez, OP Inspector, San Antonio, Texas

Others Present: Rob Bittermann, local Chairman, Brotherhood of Locomotive Engineers (BLE)

In an interview conducted as part of an investigation of the Western Southern Railroad (WS) head-on collision that occurred on June 22, 1997, at Devine, Texas, Mr. Voker stated, in substance, the following.

He is 28 years old and is currently employed by the WS as a Locomotive Engineer. His home terminal is San Antonio, Texas. He was hired by the WS on July 5, 1989, as a Brakeman/ Switchman. Although he is a promoted conductor, he has never worked a conductor's position. They promoted him to locomotive engineer in October of 1993. He was last examined on the railroad's operating rules on January 20, 1995. His last physical examination occurred at approximately the same time, as he was going through his engineer's certification. To the best of his recollection, he does not remember ever attending a formal safety meeting.

Except for approximately 3 months when he was on loan at Smithville, Texas, he has been operating over the territory where the accident occurred since October 1993. Within the past 60 days he has made approximately 10 to 15 round trips between San Antonio and Laredo, Texas.

After receiving a statutory off-duty period, Engineer Voker was called on duty for 1 p.m. on June 22, 1997, at the hotel where the crews are lodged in Laredo, Texas. His was a two-man crew called to operate freight Train MLDLI-22 to San Antonio, Texas. The other crewmember that day was Conductor T. Winston. To have enough time to stop and pick up something to eat, Conductor Winston and he showed up at the lobby of the motel at approximately 12:30 p.m. From the motel they were transported in a crew van to Port Laredo yard, approximately 10 miles north of Laredo, Texas.

When they arrived at Port Laredo Yard, they received their train consist and track bulletins. Both Conductor Winston and he and reviewed these. They remained at the yard office approximately 45 minutes. After reviewing the paperwork, they were transported to the south end of the yard to get on the train. When Engineer Voker boarded the train, he found a slip of paper on the lead unit, indicating that the carmen at Port Laredo had conducted an "Initial Terminal" air brake test.

There were no exceptions noted with the results of the air test, either by Conductor Winston or himself. Engineer Voker then went to make a visual inspection of his engine consist. His inspection revealed nothing out of the ordinary. Everything appeared okay with the locomotives. However, before departing Port Laredo Yard they did discover a bad order car. This car had to be set out by them. Then, while the railroad special agent was inspecting the train, he found another bad order car. This one had a defective no eight valve, or something. Anyway, they repaired the car before departing.

Prior to setting out the bad order car at Port Laredo Yard, they were issued a Track Warrant, via radio, authorizing them to proceed from YL 397.5 to Callaghan. The track warrant also instructed them to clear the main track at Callaghan. They finally departed Port Laredo at approximately 3:30 or 4 p.m. (He is not

exactly sure of the time). When they arrived at Callaghan, the conductor got off at the south end. Then, after the switch was lined for the siding, he went into the siding. After the train was in the clear, the conductor lined the south switch back for the main track, and started toward the north end of the siding in the crew van. The train they were supposed to meet at Callaghan sustained an [undesired emergency application of the air brakes] somewhere in the vicinity of Mile Post (MP) 376. Conductor Winston then took the crew van and went over to assist this crew with the repairs.

Engineer Voker stated that while waiting at Callaghan for the southbound train to arrive, he copied a track warrant. The track warrant instructed them to proceed from Callaghan to Gardendale on the main track, and clear the main track at Gardendale. After meeting the southbound train at Callaghan, they went on to Gardendale and got in the clear as instructed. At Gardendale the Border Patrol conducted an inspection of their train. During the inspection, the Border Patrol apprehended two illegal aliens on one of the trailing units. After approximately a 45-minute delay (for the Border Patrol inspection and to meet one southbound train) they departed Gardendale. He pulled out onto the main track and his conductor stayed at the north switch to line the switch back to normal. After that, the conductor was taken to the head end of their train in the crew van.

Although they were not supposed to do any work en route, they had been instructed to pick up eight ballast cars off the spur track at Derby (at MP 321.5). At Derby they made the pick up without incident and continued on to the siding at Melon. Their third track warrant, received at Gardendale, had authorized them to proceed from Gardendale to Melon, and clear the main track at Melon. When they arrived at Melon there was a train waiting for them. Mr. Voker went on into the siding with his train. When his train was in the clear the other crew lined the south switch for the main track and departed. After they got in the clear at Melon, the dispatcher informed them that they would be there for approximately 45 minutes waiting for another train.

At this time Engineer Voker asked the driver of the van to take him over to Pearsall (a town approximately six miles away) to get something to eat. At the Sonic drive-in, he purchased a chicken sandwich and then returned to his train. The conductor had stayed behind, not needing to get anything to eat. After he got back to his train, the southbound train went by. Both Conductor Winston and he identified the train as the WS 400 South. At Melon, they had received their fourth track warrant. This one authorized them to proceed from Melon to Gessner on the main track. Box seven (7) was checked, indicating the track warrant was [not in effect until after the arrival of the WS 400 South at Melon]. The track warrant also instructed them to clear the main track at Gessner. Once the WS 400 South went by, they departed Melon. Again he pulled out onto the main track while his conductor remained at the switch to line it back to normal position. Once the switch was lined for the main track, the crew van transported the conductor to the head end of their train.

At this point in the interview, Mr. Voker was asked if they had overheard the train dispatcher talking to the southbound train at Gessner? Had they overheard any conversation between the dispatcher and this southbound train? He stated that they did not hear anything. He was asked if they were aware that there was another train out there? His answer was that, they first were aware of another train heading south when the dispatcher gave them a track warrant authorizing them to proceed from Gessner to the yard limits in South San Yard in San Antonio. He stated that this track warrant contained a Box 7 stating that the track warrant was not in effect until after the arrival of the WS South at Gessner.

Mr. Voker also stated that there is a Hot Box Detector located at MP 281, which is approximately 10 miles north of Devine where the accident occurred, and they never heard the detector go off. He stated that, based on the time the accident occurred, the southbound train would have been going by this detector at approximately the same time they were going by MP 299. He went on to say that the Hot Box Detectors used to override any conversation taking place, even the train dispatcher. Now, if they happen to be going by a Hot Box Detector while the dispatcher is talking, they cannot hear the detector message and have to ask permission from the dispatcher to proceed at 35 mph, or things of that nature.

Mr. Voker was also asked if that night they were able to hear other detectors actuated by trains they had met, and he answered that they were able to hear the Hot Box Detector at MP 328 being actuated by one of the trains they had met at Melon.

Sometime after departing from Melon they received the track warrant that authorized them to proceed from Gessner to YL 268 (South San Yard) on the main track. The warrant also contained a "Box 7" that said, not in effect until after arrival of WS South at Gessner.

Approaching Devine, Texas, from the south, there is a slight descending grade that ends approximately at the main street of town. Mr. Voker stated that just before the collision occurred he was doing the normal things such as, sounding the whistle for crossings (there are several of them in Devine), looking out for vehicular traffic, etc. Somewhere in the vicinity of Main Street they observed what appeared to be a brightness over the horizon which vehicular traffic did not cause. He remembers standing up from his position behind the controls, and believes Conductor Winston did the same. Both of them were trying to figure out what it could be. They ruled out vehicle headlights, but there are traffic lights on the road next to the tracks toward the hill, and sometimes you can get fooled by these lights. Anyway, they stood up to get a better view. He remembers thinking, it can't be a train. Both Conductor Winston and he just knew it could not be a train. However, within seconds they saw the headlight creep over the crest of the hill. There was a comment made, he does not remember if he made it or if Conductor Winston made it. Something to the effect, "You have to place it in emergency." He immediately placed his train in "emergency" and turned to exit the cab through the rear door. He stated that the last time he saw Conductor Winston he was headed for the front door of the cab. Engineer Voker exited the cab of the locomotive and ran along the catwalk to the rear. At this point he does not remember whether he climbed down the steps or just jumped from the platform. The next thing he remembers is that he was on the ground, and under some trees next to the tracks. He heard the explosion as the trains collided and started to run away from the tracks almost in an easterly direction; probably toward the road that parallels the track at this point.

Within minutes, there were people around him. He does not know who they were, probably local citizens, as there are neighborhoods alongside the tracks. The collision created a fire, and because of the fire's intensity he was unable to look for his conductor. He remembers indicating to someone the location he believed Conductor Winston should have been. EMS arrived on the scene probably within 15 or 20 minutes after the collision. He remained at the scene approximately 45 minutes before being transported by EMS to University Hospital in San Antonio, Texas. Before leaving the accident site, he noticed that they had found Conductor Randy Dennis from the other crew. Conductor Dennis was unable to talk because he was burned really bad and in severe pain.

At the hospital they examined and found him to have contusions only, with no severe injuries, although he was in pain. After the examination they required that he wait from approximately 2:30 a.m. until approximately 4:30 a.m. for the people that were to conduct the Post Accident drug test.

There were two collectors. They informed him that this was a "Post Accident" drug test. He signed some forms, then was administered the breathalyzer test. After that they drew blood from him. He completed more forms, saw them seal the tubes, and then they asked him to provide a urine specimen. The collector went into the restroom and added bluing to the stool; he does not remember whether the water was shut off or not. He remembers that the restroom was small and had only one commode and a sink. He provided the specimen and observed while the collector sealed it in the plastic containers. He signed more forms and concluded the test. Mr. Voker stated that he took no exception in the way the drug and alcohol test was conducted. His only complaint was that they made him wait for more than two hours, in pain, waiting for the collectors to arrive.

From University Hospital they released him and he went home.

Human Factors Circadian Rhythms Supplement

Technical Bulletin G-92-15, issued on November 2, 1992, prescribes the Human Factors Circadian Rhythms Supplement. It must be completed and submitted as part of an accident investigation report if employee fatigue, or a deterioration of employee alertness may have caused or contributed to the accident. A separate report should be completed for each employee.

1. Develop the on duty - off duty cycle for the 10-day period prior to the accident/incident. If in that 10- day period the employee was continuously subject to call, develop the on duty - off duty cycle from the last day that the employee was not subject to call. Do not exceed 30 days. Use a 24-hour format. Include the type of assignment, i.e., yard, local, through freight, deadheading, etc.
2. Commuting distance from residence to home terminal.
 - A. Miles one way _____.
 - B. Travel time one way _____.
3. Number of hours notice given for call time _____.
4. For the off duty period prior to the accident/incident, develop the employee's activities, i.e., sleep patterns, diet, recreation, family activities, etc.
5. In the employee's last off duty period prior to the accident/incident, how well was the employee able to sleep? For C, D, and E, explain why.
 - A. Easily
 - B. Slight difficulty
 - C. Moderate difficulty
 - D. Great difficulty
 - E. Not at all
6. How well rested was the employee when he/she last awoke? For B, C, and D, explain why.
 - A. Well rested
 - B. Moderately rested
 - C. Slightly rested
 - D. Not at all rested
7. During what time periods prior to the accident/incident did the employee feel:
 - A. Fully alert
 - B. Moderately alert
 - C. Drowsy
 - D. Fighting sleep

8. To what did the employee attribute any fatigue, or deterioration in alertness? What did he/she do to control it?